By Matt Hiebert

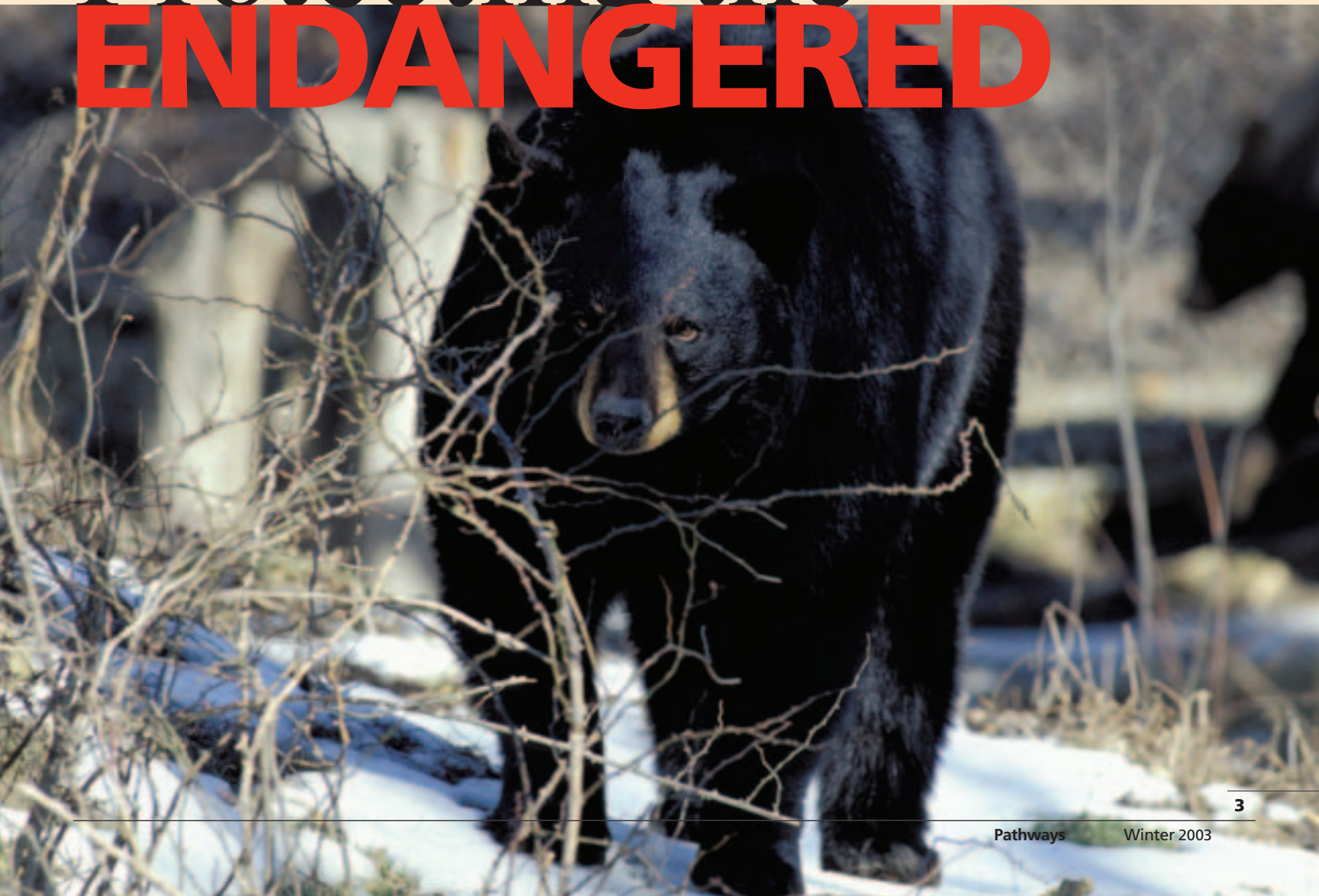
Snakes, bears and bats can relax when MoDOT goes to work.

You don't just drive a bulldozer through the heart of a forest to build a road. Nor do you simply drop a pier in the middle of a river to build a bridge.

In fact, before any construction begins on a transportation project, you first have to assess the environmental impact on the flora and fauna already living in the area. For the Missouri Department of Transportation, that task falls with the agency's Environmental Services section.

"As soon as the project is identified and starts taking shape, the project manager or one of the engineers fills out a request for Environmental Services," explains Alan Leary, an

Protecting the ENDANGERED



environmental specialist for MoDOT. "Each one of us in our office reviews a copy of the request to see if the project may have an impact on resources within our specialty."

Leary and his peers have responsibilities that are mandated by a federal act. In 1969, Congress passed the National Environmental Policy Act, which established a national policy to "encourage productive and enjoyable harmony between man and his environment." In short, it says that any action involving federal funds, property or personnel must be reviewed for its environmental impact.

"It's sort of an umbrella policy that includes the Endangered Species Act, Clean Air Act, Clean Water Act, hazardous waste, cultural resources, Environmental Justice and other areas," Leary explains. "It provides a checklist of things we must consider."

Special traps were used to funnel the Massasauga rattlesnakes into wire cages so they could be counted.

Agency Responsibilities

The checklist is extensive. MoDOT environmental specialists evaluate how each job could potentially affect wetlands, streams, noise levels, parklands, farmlands, cultural resources, wildlife and natural communities. For smaller tasks, like lane striping, MoDOT experts usually can analyze the job and supply a "categorical exclusion," which is a brief statement that says the project will not have a negative impact on the plants and animals in the area.

For bigger jobs, MoDOT's responsibility expands. Environmental reviews can be as brief as a four- or five-page document listing potential impacts, all the way up to a large document called an Environmental Impact Statement, which can be several hundred pages long.

"At that point the environmental review can take three to five years to complete and involves extremely in-depth analysis of all the potential impacts," Leary explains.

To The Database and Beyond

Leary focuses on the plants and animals that may be affected. After he receives and studies the Environmental Services request, he consults a database that lists all the known locations of rare plants and animals in Missouri.

The Missouri Department of Conservation maintains the Natural Heritage Database, which tracks sightings and locations of all the rare plants and animals throughout Missouri. Through an agreement with MDC, MoDOT has access to this database. Although the database is up-to-date and as accurate as possible, it is only the first step in Leary's research.

"If the database doesn't show anything but we have reason to believe a rare species may occur in an area, we often go out and take a look at the site," Leary says. "Some locations we just know have a high potential for the presence of a rare species. For example, we know there are endangered mussels in certain rivers so even if the database doesn't list them at a particular site within the river, they could still be there."

Site preparation for relocation of the rare Geocarpon plant near Route 13 in St. Clair County

MoDOT works closely with other state and federal agencies during the analysis process. With endangered species, the U.S. Fish and Wildlife Service and MDC play important roles.

"We have a good relationship with the U.S. Fish and Wildlife Service," Leary says. "They are responsible for implementing and enforcing the Endangered Species Act. By working closely with them during the early stages of a project we can avoid delays later in the process."

So, what happens once the presence of an endangered species is confirmed? It depends. MoDOT has a wide spectrum of options to choose from. Take for instance the Eastern Massasauga rattlesnake.

The Rattlesnake's Tale

It began with a routine bridge replacement in Northwest Missouri. MoDOT was replacing three bridges on Route 118, and needed a large quantity of fill dirt to finish the job. Although hauling the fill in from a distant location was an option, it would have been very costly. Then, one of MoDOT's environmental specialists suggested using fill dirt from the adjacent Squaw Creek National

Wildlife Refuge, a 7,400-acre facility operated by the U.S. Fish and Wildlife Service.

A brief investigation found the right kind of dirt in an area that had been taken over by an invasive strain of reed canary grass. The grass wasn't providing any benefit to the native wildlife and was actually keeping other species from thriving.

All MoDOT had to do was dig a foot-and-a-half deep over 35-acres and the construction crew would have its fill dirt. Then MoDOT would reseed the area with wetland plants and create a quality habitat for the native wildlife. Everybody would be happy.

The only potential consideration was a little critter called the *Sistrurus catenatus catenatus*, more commonly known as the Eastern Massasauga rattlesnake. A resident of the refuge, this snake is one of only five species of venomous snakes in Missouri. It is also on the Federal Candidate Species list, which is one step away from threatened or endangered species status.

"We have the largest population of Eastern Massasauga in Missouri and possibly in the Midwest," explains Frank Durbian, wildlife biologist for the refuge. "We'd been studying their movement and population for some time."

Finding out if the snake used the borrow site was the primary question. That's where the U.S. Fish and Wildlife Service and MoDOT formed a partnership and worked together.

MoDOT is good at moving dirt and building bridges, but when it comes to surveying snakes, the U.S. Fish and Wildlife Service are the experts. So MoDOT supplied the money and the Fish and Wildlife Service did the rest.

"MoDOT provided the funding for the technician and materials we needed to set out drift fence traps to see if the snakes were using the borrow site," Durbian says.

The traps consisted of a flat piece of board propped upright in the ground. On either end of the board a funnel leads to a small cage. When snakes tried to go around the board, they were funneled into the cage to await a headcount.

"We have the largest population of Eastern Massasauga in Missouri and possibly in the Midwest."

Frank Durbian, wildlife biologist

Once researchers tallied the results, it was determined that the Massasaugas weren't using the proposed borrow site and MoDOT could commence digging.

"Things turned out exactly like we hoped," Leary says.

Durbian agrees.

"It was a good partnership," he says. "The solution was very beneficial for everyone involved. MoDOT got their fill dirt, and the refuge got a wetland out of it."

Developing Our Mussels

Of course, not every endangered-species project goes that smoothly. When a listed species is found on a construction site, a whole new set of issues can arise.

MoDOT builds, replaces and repairs a lot of bridges. Obviously, this means the agency frequently works around rivers and streams. One species that keeps popping up in these cases is the humble mussel.

They seem to be everywhere. Any Missourian who's waded through a creek might find it hard to believe that these little, hard-shelled mollusks are on the endangered species list. But some varieties are, and MoDOT knows how to handle them.

"We encounter mussels regularly," Leary says. "In several situations, we have been unable to avoid negative impacts to the native mussels so we did mitigation in the

Eastern Massasauga rattlesnake

PHOTO ON PAGE THREE, DEPARTMENT OF CONSERVATION; OPPOSITE PAGE LEFT, US FISH AND WILDLIFE SERVICE; TOP, DEPARTMENT OF CONSERVATION; PHOTO THIS PAGE, US FISH AND WILDLIFE SERVICE

Because of their endangered species status, pink mucket mussels require special care when being moved from one location to another.

form of a relocation to reduce our impact on the species."

That means packing them up and moving them elsewhere. This practice has become so common that there are actually scuba-diving companies specializing in it, Leary says.

"You can't just pull them off the bottom of a river and toss them in a boat. They have to be kept wet, aerated and transferred from point A to point B within a two-hour period," he explains. "There are some very specialized techniques involved."

In the case of the endangered pink mucket pearly mussel, every one must be carefully moved and placed on its new river-bottom home individually. Divers can spend days underwater collecting and relocating the creatures. This also gives divers an opportunity to register and track the mussels.

Environmental specialists seine for minnows to determine if an endangered species is present.

"The divers take a Dremel tool and carve a number on the mussel's shell. Then they record location information, the size it was when it was moved and other data and associate it with that mussel based on its number," Leary says. "It makes it much easier to keep track of them down the road and analyze growth rates and other data."

Backing the Bats

Sometimes relocation isn't the answer. A species may be spread over too wide an area, or they may not be quite as easy to catch as mussels. In that case, the best option is to protect their known locations. The Indiana Bat is a good example of this approach.

"The bats are an issue I deal with frequently," Leary says. "Project managers and others call me almost every day about them."

The Indiana Bat joined the endangered species list after an ongoing study measured a decline in the population. Despite an undeserved bad reputation, bats are beneficial animals that control insect populations and contribute nutrients to cave ecosystems. This particular variety is found mainly in Indiana, Kentucky and Missouri.

Aside from their mobility, the bats are difficult to deal with because of their roosting habits. They winter in caves, but in the summer they prefer to hang out in shagbark hickories, white oaks and …

"… any tree which is greater than nine inches in diameter with loose or peeling bark," Leary says. "That can make things pretty restrictive."

And, Leary adds, the categorical range of protected trees changes occasionally as biologists collect more information about the bats' habits.

"We used to just consider shagbark hickories and white oaks suitable habitat," Leary says. "Then biologists found Indiana Bats in broken limbs and under peeling bark of dead trees. So we now consider all dead trees with loose or peeling bark, or with broken tops and limbs, to be potentially suitable habitat."

Because of the wide area wandered by the flying mammals, Leary keeps busy ensuring contractors and MoDOT personnel involved meet federal guidelines.

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Protecting the **ENDANGERED**

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"I get calls regularly from MoDOT district offices wanting me to come out and see if a tree meets the criteria before it's removed," Leary says. "Or they want me to clarify the criteria."

"The bats are an issue I deal with frequently. Project managers and others call me almost every day about them."

Alan Leary, environmental specialist

Of Bridges and Bears

Sometimes, Leary says, it's what you don't do that can help the most.

"With the bats, we don't cut suitable trees in summer. With mussels we can avoid putting piers in rivers. And for fish," he notes, "we either avoid working in the river during spawning season or we'll use cofferdams around the work area and implement special erosion-control measures."

The Indiana bat keeps MoDOT environmental specialists busy.

Sometimes the design of a new highway feature can help. Anyone who's driven down a Missouri highway knows that traffic takes its toll on wildlife. This fact has encouraged some cooperative planning between agencies when building highways.

A few years ago, MoDOT, the Missouri Department of Conservation and the Mark Twain National Forest worked together to develop a highway design that would help protect black bears and keep their population from being fragmented by another road.

The plan was to widen the medians and easements between lanes within the national forest to provide a safer crossing for bears. Leary says the concept of building highway structures to protect wildlife is popular in Europe already.

"They actually build bridges over highways for the wildlife to use," he says. "They have trees, grass and bushes growing on them in hopes the animals will take that route rather than crossing the busy autobahn."

Although MoDOT doesn't have the budget to build bridges for wildlife, the partnerships the agency has formed with federal and other state agencies give rare species a better chance to coexist with people.

These efforts only scratch the surface of MoDOT's responsibilities to Missouri's ecology. With an endangered species list that includes hundreds of animals and plants, Leary and the Environmental Services staff have plenty to keep them busy for the next few decades. ■

Matt Hiebert is the editor of Pathways *and an outreach specialist at MoDOT General Headquarters.*

European road designers have been building wildlife overpasses for years.

PHOTOS THIS PAGE: LEFT AND TOP, DEPARTMENT OF CONSERVATION; BOTTOM, FEDERAL HIGHWAY ADMINISTRATION
PHOTOS OPPOSITE PAGE: LEFT BY CATHY MORRISON; RIGHT BY SHAUN SCHMITZ. PHOTO ON BACK COVER BY MIKE WRIGHT